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United we scan

An inexpensive and invaluable office tool, a scanner can take a letter, send a fax, file your reports and, of course, digitise images. Tom Gorham shows you how to get better results and boost productivity using your scanner

While the technology world has fallen over itself to proclaim the virtues of PDAs (personal digital assistants), digital cameras and digital video, the scanner has remained in that section of peripherals firmly labelled 'unfashionable'. However, if you're interested in cutting-edge technology at a bargain price, there really hasn't been a better time to invest in a desktop scanner.

Digital cameras and videos are stuck in an unhappy marriage of evolving technology and expensive price tags, but this is no longer the case with scanners. Five years ago quality scanners were still the preserve of the professional, with a

high-calibre flatbed costing around £5,000. Nowadays you can get the equivalent quality for a tenth of the price.

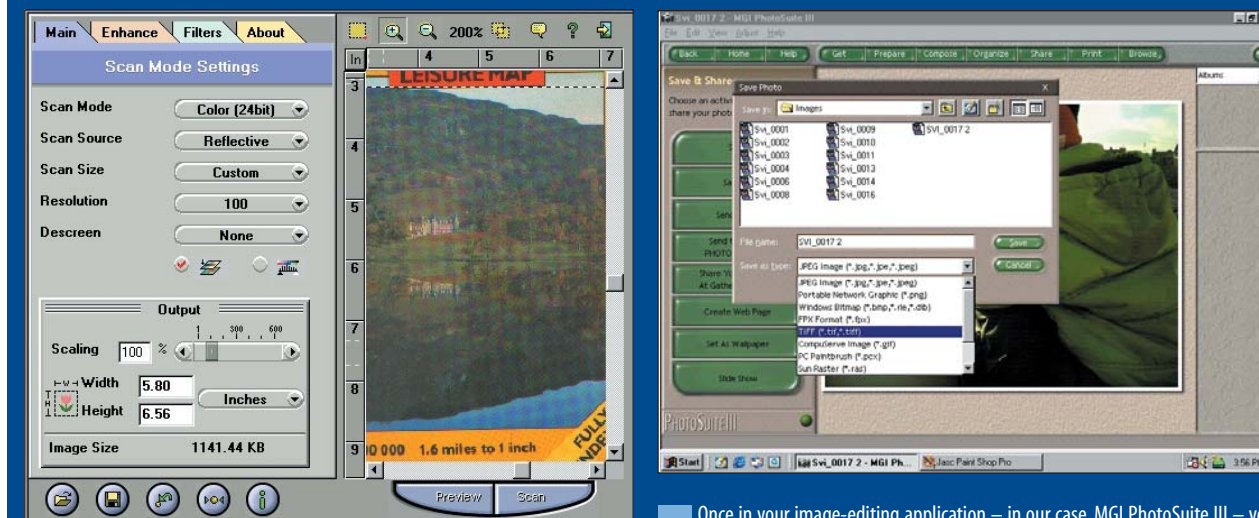
Even taking value out of the equation, a scanner is a very versatile device – not only can you use it to share pictures with friends and relatives, it also allows you to repair old photographs. A scanner can double as a copier or fax and, with specialist software, as an archiving tool. You can record static data such as text and repurpose it so it can be retrieved from your hard disk at a moment's notice.

We're going to look at some tips for choosing the best scanner for your needs and how to get the most out of it.

ILLUSTRATION: JESS READ

Scanning photographs

For best photographic results, place the image to be scanned as near as possible to the scanner's 'sweet spot' on the glass plate, where the scan head gives the sharpest results. It's generally in the middle of the scanning bed, away from the edges. Performing a preview scan allows you to set the scan area, which saves time and file size during the final scan.



1 Using your scanner's software, set the bit depth to 24bit colour and work out the resolution according to what the image will be used for. If you're outputting to a monitor, setting a resolution of 72-150dpi (dots per inch) should be enough. For print, increase the image's resolution to 300dpi. To enlarge the final image, increase the scaling percentage. The result will rarely be as sharp as the original image

2 Once in your image-editing application – in our case, MGI PhotoSuite III – you can make final adjustments to the photo before saving it. If you're archiving the file, save it in a non-compressed image format, such as TIFF or BMP. Compression formats such as JPEG introduce artefacts into the image and should only be used where space is a primary concern and you know you won't need to reuse the image

Scanner technology

The most common type of scanner is the flatbed variety. The technology that enables a scanner to turn a photo or document into a digital file is complicated. The item to be scanned is placed on a transparent glass plate. A scan head made up of a CCD (charge-coupled device), lens and lamp moves underneath the plate and light from the lamp is reflected back off the item. Image data is read by the CCD and translated by the software. Other scanner types work in a similar way and mainly differ mechanically. In sheetfed scanners, for example, paper is fed over a static scanning mechanism.

Traditionally, the market was divided into two camps: SCSI-based scanners offered ultra-fast scanning at a high cost, while parallel port interfaces were cheaper but slow and troublesome to install. In the last two years, SCSI has been usurped by FireWire at the high end of the market, while USB dominates the budget space as it's faster and easier to use than its parallel predecessor. Not only are USB

scanners hot-pluggable (you don't need to turn your PC off to attach them) they can also co-exist with other USB devices.

What you need

Compared to many peripherals, the system requirements for scanners are relatively undemanding. However, scanning large images at high resolutions and permanently storing them on your PC will require a sizable hard disk. Equally, if you're going to be adjusting your scans in an image-editing application this will make demands on your processor. That said, any Pentium processor faster than 300MHz possesses enough horsepower to scan photographic prints.

The only way older PCs may be caught out is by the shift of scanner hardware to the USB protocol. Older Windows 95 systems (Service Release 2.1 or later) include USB support, but support in Windows 98 and higher is more robust. Parallel port scanners, on the other hand, won't pose a problem as this interface comes as standard on just about every

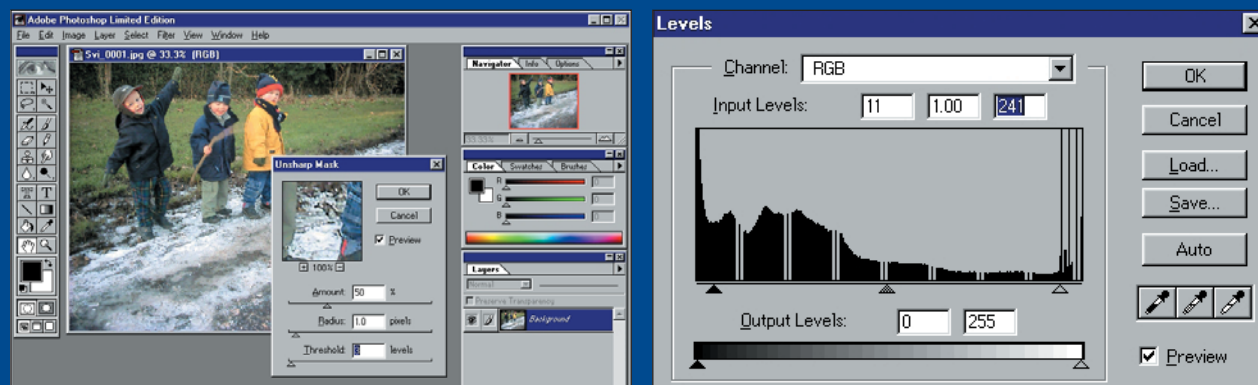
PC sold. If you want a SCSI or FireWire scanner, though, you'll need to invest in a controller card for your PC.

However powerful your scanner, it's only as effective as the software that comes bundled with it. You should expect to find a Twain-compatible driver, which allows your scanner to understand the commands sent to it by any Twain-savvy application. Almost every image-editing application on the market is Twain-compliant, including the Imaging application bundled with Windows.

Most scanner bundles also include a cut-down version of an image editing application, which should offer enough features for basic image correction and organisation. There should also be an OCR (optical character recognition) package to transfer text from paper to PC. If you're interested in OCR for archiving purposes, it's worthwhile upgrading to a 'deluxe' version; not only are upgrades excellent value, but they also permit more accurate layout reproduction and add extra features.

Image perfection

Every image you scan will need some form of correction. Photographs often require contrast and brightness adjustments, while magazines or newspaper picture sources need descreening to avoid moiré effects. You can perform fundamental changes, such as contrast and brightness adjustments, during the scan itself. However, it's better to leave detailed picture enhancement to a dedicated image-editing application.



1 When you're digitising an image from a scanner source it loses clarity, which has to be manually put back. Adobe Photoshop LE's Unsharp Mask feature allows you to sharpen scanned images

2 To bring out tones flattened in a photo, use Photoshop's Levels palette, which shows the number of pixels at each brightness level in an image. To sharpen the tonal range, move both sliders towards the middle of the graph. Ensure that the Preview checkbox is ticked, so that you can see the results

Features lowdown

While the software is the most important factor in a scanner's OCR abilities, if you're interested in scanning images you'll need to concentrate on the scanner's hardware. There's a perplexing range of features here, so we'll break them down into three main areas: resolution, bit depth and dynamic range.

• **Resolution** Some buyers take a scanner's resolution as the principal arbiter of its

power, but this can be an unreliable gauge as there can often be confusion over a scanner's optical resolution and its enhanced resolution. Optical resolution is the highest number of dots per inch that can be scanned by the hardware. Enhanced (or interpolated) resolution involves the scanning software adding extra pixels to an image based on the average of the existing pixels. While some manufacturers trumpet enhanced resolution in order to give the impression

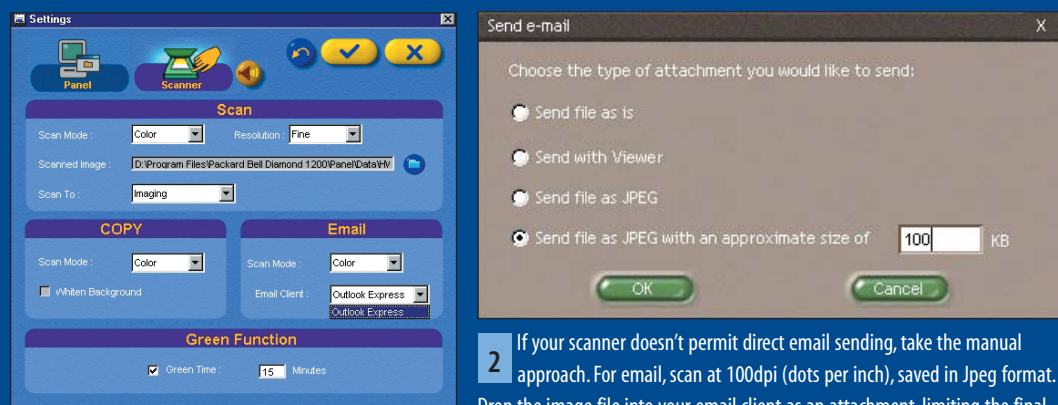
of greater power, it's the optical resolution that indicates a scanner's true abilities.

Interpolation has its place – for instance, for enlarging a postage stamp image to poster size without pixellation – but even then the job is performed more effectively by image-editing software such as Adobe Photoshop.

However, before you get carried away with the virtues of optical resolution, bear in mind that even the lowest resolution offered by budget scanners – for example,

Email straight from your scanner

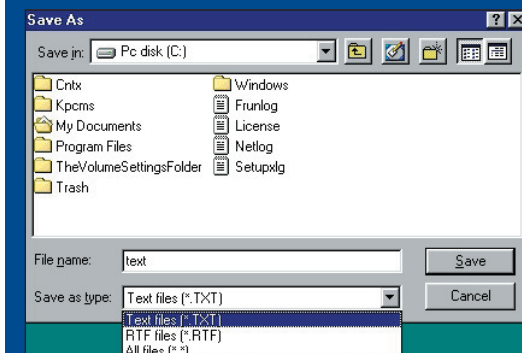
1 Many modern scanners feature single-click buttons that allow you to email, fax and copy documents. Pressing the button triggers the fax driver or sends the scanned copy to your default email client. You can alter some settings – but invariably not all – in the scanner's Control Panel



2 If your scanner doesn't permit direct email sending, take the manual approach. For email, scan at 100dpi (dots per inch), saved in Jpeg format. Drop the image file into your email client as an attachment, limiting the final file size to around 100KB

Using a scanner to archive documents

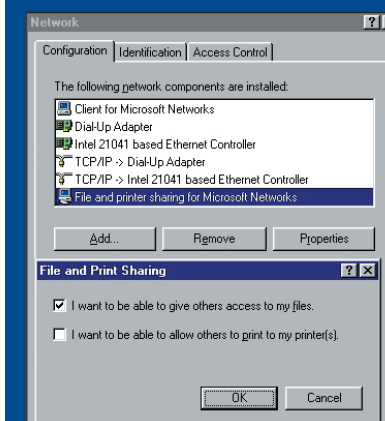
1 OCR (optical character recognition) software is useful for digitising paper-based documents such as faxes. It uses complex algorithms to decide where the text lies on a page, and works out each letter based on either programmed or learned values. If you scan in greyscale mode recognition levels are usually better than when using full colour modes



2 Once the page has been scanned and recognised, you can save it as one of a number of text file formats. Subsequent scanned pages can be automatically added to the text file to create a complete report

Sharing a scanner across a network

1 If your scanner lacks dedicated sharing software, there is a workaround by sharing a folder on the PC connected to your scanner and making that the default download location for your scans. The second PC connects to this and copies the scanned files. To activate a shared folder under Windows XP, use the Network Setup Wizard



2 In older versions of Windows you must enable file sharing from the Network Control Panel. Go to Start, Settings, Control Panel, Network. Click on the configuration tab and select 'File and printer sharing for Microsoft Networks'. In the resulting box, choose 'I want to be able to give others access to my files'

600x600dpi (dots per inch) – is more than enough for most common tasks, including printing. If you own an 800dpi inkjet, it doesn't mean you should scan at this resolution for the best results: if you do, the results will be muddled and it will take the better part of your lifetime to print. In terms of scan settings, use twice your printer's line screen – the number of lines it can print in an inch. As most inkjets and desktop lasers have a line screen between 85 and 105dpi, you're often throwing away detail by scanning at more than 200dpi.

These general guidelines vary if you're scanning line art, where higher resolutions are required, or if you need to enlarge photos beyond their original size. Bear in mind that there's only so much detail in the average 5x7in print anyway.

• **Bit depth** Another much-touted scanner feature, bit depth is a fancy way of describing the number of colours the scanner can see. Most monitors offer a 24bit display with 16.7 million colours, so why do scanners offer capture above these levels, usually at 32-, 36- or 42bits? The answer is that while they tend to transfer 24bit colour to an image-editing application, sometimes scanners can make sure this extra detail translates to a better representation of colour in the 24bit output.

Budget scanners tend to use this extra bit depth to suppress noise and other artefacts created by a cheap scanning mechanism, rather than enhance its depth.

• **Dynamic range** If you're planning to scan transparencies or enlarge images, it's important to take into account a scanner's dynamic (or density) range. This corresponds to its ability to capture shadow and theoretically lies between a value of 0 and 4. Most scanners offer enough dynamic range (above 2.4) to adequately reproduce shadow when scanning photos. However, if you're working with transparencies or negatives, you'll need a density range above three.

In the end, the most reliable way to judge a good scanner is by viewing its output yourself, or by relying on extensive, real-world testing. A good place to start is the Flatbed scanners chart published every month in *PC Advisor* (page 130).



For top-quality text scanning, see our PDF tutorial on the cover disc